Exhibit A

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant	: Kulkarni, et al.	Confirmation	: 4127
Serial No.	: 11/709,477	Examiner	: Martello, Edward
Filing Date	: 02/21/2007	Art Unit	: 2628

Attorney Docket No. : PNTA-P006.CIP.A

For: ROOT IMAGE CACHING AND INDEXING FOR BLOCK-LEVEL DISTRIBUTED APPLICATION MANAGEMENT

AMENDMENT AND RESPONSE TO OFFICE ACTION

Commissioner for Patents & Trademarks
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

In response to the Office Action mailed January 5, 2010, please consider the following amendments and remarks in the above captioned patent application.

I hereby certify that this correspondence is being electronically transmitted to the USPTO via EFS on the date shown below:
April 5, 2010
/Shannon Warren/
Shannon Warren

Amendments to the Claims:

1. (Currently amended) A system for providing data to a plurality of compute nodes comprising:

a first storage unit for storing blocks of a root image of said compute nodes;

a plurality of second storage units for storing leaf images of respective compute nodes, said leaf images comprising additional data blocks not previously contained in said root image and changes made by respective compute nodes to the blocks of said root image, wherein said leaf images of respective compute nodes do not include blocks of said root image that are unchanged by respective compute nodes; and

a cache for caching blocks of said root image previously accessed by at least one of said compute nodes.

2. (Original) The system as recited in Claim 1 wherein said cache is configurable to store the X most recently accessed blocks of said root image, and wherein further X represents a cache threshold value.

3. (Original) The system as recited in Claim 1 wherein said first storage unit, said second storage units, and said cache are contained within a single storage appliance.

4. (Original) The system as recited in Claim 1 further comprising:

a plurality of union block devices for interfacing between respective compute nodes and said first storage unit, respective second storage units, and said cache to distribute application environments to the compute nodes, wherein said union block devices create said application environments by merging the blocks of said root image with the blocks of respective leaf images.

5. (Original) The system as recited in Claim 0 wherein said union block devices comprise low-level drivers for interfacing between the file systems of respective compute nodes and said first storage unit, respective second storage units, and said cache.

6. (Original) The system as recited in Claim 1 wherein said first storage unit is read-only.

7. (Currently amended) A method for providing data to a plurality of compute nodes, comprising:

storing blocks of a root image of said compute nodes on a first storage unit;

storing leaf images for respective compute nodes on respective second storage units, said leaf images comprising additional data blocks not previously contained in said root image and changes made by respective compute nodes to the blocks of the root image, wherein said leaf images of respective compute nodes do not include blocks of said root image that are unchanged by respective compute nodes; and

caching blocks of said root image that have been accessed by at least one of said compute nodes in a cache memory.

8. (Original) The method as recited in Claim 0 further comprising:

receiving a read request from at least one of said compute nodes, wherein a first portion of the data requested is currently stored in said cache memory; and

providing said first portion of said data to said at least one of said compute nodes from said cache memory.

9. (Original) The method as recited in Claim 0 further comprising:

updating said cache memory based on said read request.

10. (Original) The method as recited in Claim 0 wherein a second portion of the data requested is not currently stored in said cache memory and said updating comprises:

caching said second portion in said cache memory; and

removing the least recently accessed data from said cache memory if the amount of data is said cache memory is above a threshold value.

11. (Original) The method as recited in Claim 0 further comprising:

merging the blocks of said root image with the blocks of respective leaf images to create cohesive respective application environments.

12. (Original) The method as recited in Claim 0 wherein said merging occurs at an operational level between the respective file systems of the compute nodes and said first storage unit, respective second storage units, and said cache memory.

13. (Original) The method as recited in Claim 0 wherein said first storage unit is read-only.

14. (Currently amended) A system for indexing file systems for a plurality of compute nodes, comprising:

a first storage unit for storing blocks of a root image of said compute nodes;

a plurality of second storage units for storing leaf images of respective compute nodes, said leaf images comprising additional data blocks not previously contained in said root image and changes made by respective compute nodes to the blocks of said root image, wherein said leaf images of respective compute nodes do not include blocks of said root image that are unchanged by respective compute nodes; and

a plurality of union block devices corresponding to said compute nodes, said union block devices for interfacing between said compute nodes and said first and second storage units to distribute said file systems to said compute nodes, wherein said union block devices create said file systems by merging the blocks of said root image stored on the first storage unit with the blocks of respective leaf images stored on respective second storage units, and wherein further at least one of said compute nodes is configurable to index said root image and provide the indexing results to another of said compute nodes.

15. (Original) The system as recited in Claim 0 wherein said first storage unit and said second storage units are contained within a single storage appliance.

16. (Original) The system as recited in Claim 0 further comprising:

a plurality of union block devices for interfacing between respective compute nodes and said first storage unit and respective second storage units, said union block devices operable to distribute application environments to the compute nodes, wherein said union block devices create said application environments by merging the blocks of said root image with the blocks of respective leaf images.

17. (Original) The system as recited in Claim 0 wherein said union block devices comprise low-level drivers for interfacing between the file systems of respective compute nodes and said first storage unit, respective second storage units, and said cache.

18. (Original) The system as recited in Claim 0 wherein said first storage unit is read-only.

19. (Currently amended) A method for indexing file systems for a plurality of compute nodes, comprising:

storing blocks of a root image of said compute nodes on a first storage unit;

storing leaf images for respective compute nodes on respective second storage units, said leaf images comprising additional data blocks not previously contained in said root image and changes made by respective compute nodes to the blocks of the root image, wherein said leaf images for respective compute nodes do not include blocks of said root image that are unchanged by respective compute nodes;

merging the blocks of said root image with the blocks of respective leaf images stored on respective second storage units to create respective file systems for respective compute nodes;

receiving indexing results pertaining to said root image from one of said compute nodes; and

providing said indexing results to the others of said compute nodes.

20. (Original) The method as recited in Claim 0 further comprising:

storing said indexing results on a shared storage unit.

21. (Original) The method as recited in Claim 0 wherein said merging occurs at an operational level between the respective file systems of the compute nodes and said first storage unit and respective second storage units.

22. (Original) The method as recited in Claim 0 wherein said first storage unit is read-only.

23. (Currently amended) Logic encoded in one or more tangible media for execution by a first compute node, and when executed said logic operable to:

receive data blocks of a file system, said data blocks comprising a root image portion and leaf image portion, said leaf image portion comprising additional data blocks not previously contained in said root image portion and changes made by said first compute node to the blocks of said root image, wherein said leaf image portion does not include blocks of said root image that are unchanged by said first compute node, wherein said file system is the result of merging said root image portion and said leaf image portion together at the block-level;

index said root image portion; and

provide the results of said indexing to a second compute node, wherein said logic encoded in the one or more tangible media comprise computer executable instructions executed by the first compute node.

24. (Original) The logic as recited in Claim 0 wherein said providing further comprises:

storing said results of said indexing on a shared storage unit accessible by said second compute node.

25. (Original) The logic as recited in Claim 0 wherein said logic is further operable to:

index said leaf image portion.

26. (Original) The logic as recited in Claim 0 wherein said logic is further operable to:

re-index said file system by re-indexing said leaf image portion and merging the results of said re-indexing of said leaf image portion with said results of said indexing of said root image portion.

27. (Original) The logic as recited in Claim 0 wherein said root image portion is read-only.

REMARKS

Claims 1-27 are pending. Claims 1, 7, 14, 19, and 23 are amended. No new matter has been added as a result of these amendments.

Objection to the Specification

The Specification is objected to for allegedly failing to provide proper antecedent basis for the claimed subject matter. The rejection contends that Claims 4, 5, 14, 16, and 17 claim "union block devices" but have insufficient basis within the claims to define the character of these devices. Applicants respectfully disagree.

Applicants respectfully assert that the union block devices, as claimed in Claims 4, 5, 14, 16, and 17 are defined in at least Paragraphs 0024 and 0027-0029 of Applicants' Specification and illustrated in Figure 2. In particular, the union block devices (UBDs) are defined as coupling compute nodes to the first storage unit and corresponding second storage units (paragraph 0024; and Figure 2). Applicants respectfully assert that one skilled in the art would understand that the compute nodes mount instantiations of the application environment via their respective UBDs, which are described in one embodiment as low-level drivers that operate as an interface between the first and second storage devices and the file system of each compute node (Paragraph 0027). Because the UBDs operate below the file system, they are concerned merely with the blocks of data themselves, rather than the files they form (Paragraph 0027). Applicants respectfully assert that the UBDs implemented as low-level drivers (software) are illustrated in Figure 2 as coupling the compute nodes with the first storage unit and corresponding second

storage units. In other words, Applicants respectfully assert that one skilled in the art would understand that the UBDs may be implemented as low level drivers serving to couple the hardware together (compute nodes, first storage unit and corresponding second storage units) (Paragraph 0024 and 0027).

Claim Rejections – 35 U.S.C. §112

Claims 4, 5, 14, 16, and 17 are rejected under 35 U.S.C. 112, second paragraph, as being allegedly indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. In particular, the rejection contends that Claims 4, 5, 14, 16, and 17 incorporate features called "union block devices" with insufficient basis within the claims to define their character. Applicants respectfully disagree. For the same or similar reasons as stated above, Applicants respectfully assert that the "union block devices" as claimed in Claims 4, 5, 14, 16, and 17 are defined in at least Paragraphs 0024 and 0027-0029 of Applicants' Specification and illustrated in Figure 2.

As stated above, Applicants respectfully assert that the union block devices, as claimed in Claims 4, 5, 14, 16, and 17 are defined in the Specification as coupling compute nodes to the first storage unit and corresponding second storage units, wherein the compute nodes mount instantiations of the application environment via their respective UBDs, which are described in one embodiment as low-level drivers that operate as an interface between the first and second storage devices and the file system of each compute node (Paragraphs 0024 and 0027). Applicants respectfully assert that one

skilled in the art would understand the low-level drivers to be implemented through software (Paragraph 0024). Further, because the UBDs operate below the file system, they are concerned merely with the blocks of data themselves, rather than the files they form (Paragraphs 0024 and 0027; and Figure 2).

For the above reasons, Applicants request reconsideration and withdrawal of the rejections under 35 U.S.C. §112.

Claim Rejections – 35 U.S.C. §101

Claims 23-27 are rejected under 35 U.S.C. 101 because the claimed invention is allegedly directed to non-statutory subject matter. The rejection contends that each of the claims recites the feature or limitation of logic which is encoded in one or more tangible media. The rejection advises that rephrasing Claims 23-27 to call out tangible media with or comprising computer executable instructions that perform the logic of the methods would result in statutory claims. Applicants have amended the claims as appropriate. Applicants have amended Claim 23 to further claim "said logic encoded in the one or more tangible media comprise computer executable instructions executed by the first compute node."

Claim Rejections – 35 U.S.C. §102

Claims 14-27 are rejected under 35 U.S.C. 102(b) as being allegedly anticipated by Chang (US 2003/0126242), hereinafter "Chang."

As is well established, anticipation requires the presence of a single prior art reference to disclose each and every element of the claimed invention, arranged as in the claim. There must be no difference between the claimed invention and the reference disclosure, as viewed by a person of ordinary skill in the field of the invention. Scripps Clinic & Research Found. v. Genentech Inc., 18 USPQ 2d 1001, 1010 (Fed. Cir. 1991).

Applicants contend that Chang fails to teach all of the claimed elements of Independent Claims 14, 19, and 23.

Claim 14:

Amended Claim 1 recites in part:

> a plurality of second storage units for storing leaf images of respective compute nodes, said leaf images comprising additional data blocks not previously contained in said root image and changes made by respective compute nodes to the blocks of said root image, wherein said leaf images of respective compute nodes do not include blocks of said root image that are unchanged by respective compute nodes (emphasis added)

Applicants respectfully assert Chang does not teach or suggest "leaf images comprising additional data blocks not previously contained in said root image and changes made by respective compute nodes to the blocks of said root image, wherein said leaf images of

respective compute nodes do not include blocks of said root image that are unchanged by respective compute nodes," as claimed in Claim 14.

As understood by Applicants, Chang discloses a client image copy that is created using a snapshot of a base boot image with a virtual copy or reverse snapshot of the base image stored for each client device, wherein each client image copy includes the base boot image and information specific to the client (Abstract). In particular, Chang teaches that each client image copy includes physically common operating system (OS) and application blocks for storing the base boot image and client-specific blocks for storing information specific to the particular client device (Paragraph 0012; and Figure 1). Chang discloses in Figure 2 that each client image copy includes common OS and application blocks 80 containing the reverse snapshot of the base image as well as client specific blocks 82 for storing client specific files (Paragraphs 0030-0034).

To the extent that Chang discloses leaf images that contain client specific blocks 82 as part of a client image copy, Applicants respectfully assert that Chang does not teach or suggest "leaf images comprising additional data blocks not previously contained in said root image and changes made by respective compute nodes to the blocks of said root image, wherein said leaf images of respective compute nodes do not include blocks of said root image that are unchanged by respective compute nodes," as claimed in Claim 14. Applicants respectfully assert that Chang discloses a client image copy comprising both a base boot image and information specific to the particular client device, while Applicants' claim a leaf image comprising additional data blocks not previously contained in a root

image and changes made by a respective compute node to the blocks of the root image, wherein the leaf image does not include blocks of the root image that are unchanged by the compute node, as claimed in Claim 14. Applicants respectfully assert the client image copy of Chang is not a leaf image, as claimed in Claim 14, because the client image copy of Chang includes blocks of the root image that are unchanged by a compute node (the snapshot or reverse snapshot of the boot image for each client image copy).

Therefore, Applicants respectfully assert that embodiments as recited by Claim 14 are not rendered anticipated by Chang. Accordingly, Applicants respectfully assert that dependent Claims 15-18 are patentable by virtue of their dependency on an allowable base claim, as well as for their additional recited patentable features.

Claim 19:

Independent Claim 19 recites features similar to that of independent Claim 14 and is therefore patentable for at least the same or similar reasons as recited above. Accordingly, Applicants respectfully assert that dependent Claims 20-22 are patentable by virtue of their dependency on an allowable base claim, as well as for their additional recited patentable features.

Claim 23:

Independent Claim 23 recites features similar to that of independent Claim 14 and is therefore patentable for at least the same or similar reasons as recited above. Accordingly, Applicants respectfully assert that dependent Claims 24-27 are patentable

by virtue of their dependency on an allowable base claim, as well as for their additional recited patentable features.

For the above reasons, Applicants request reconsideration and withdrawal of the rejections under 35 U.S.C. §102.

Claim Rejections – 35 U.S.C. §103

Claims 1-13 are rejected under 35 U.S.C. 103(a) as being allegedly unpatentable over Chang, in view of Kobayashi et al. (US 6,101,576), hereinafter "Kobayashi." Applicants respectfully assert that Claims 1-13 are patentable over the cited combination in view of the following.

Applicants respectfully point out that the Examiner has the burden of establishing a prima facie case of obviousness. To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim features. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on Applicant's disclosure. In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). See MPEP 2100-126. Specifically, "all words in a

claim must be considered when judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d., 1382 (CCPA 1970).

Moreover, in response to the recent U.S. Supreme Court decision in *KSR Int'l Co. v. Teleflex, Inc*. (U.S. 2007), new guidelines were set forth for examining obviousness under 35 U.S.C. 103. The U.S. Supreme Court reaffirmed the *Graham* factors and, while not totally rejecting the "teachings, suggestion, or motivation" test, the Court appears to now require higher scrutiny on the part of the U.S. Patent & Trademark Office. In accordance with the recently submitted guidelines, it is "now necessary to identify the reason" why a person of ordinary skill in the art would have combined the elements of cited references, or at least describe the pertinence of the elements set forth in the cited disclosure, in the manner presently claimed.

Applicants respectfully assert the combination of Chang and Kobayashi fails to teach or suggest all the claimed elements of Claims 1-13 in view of the following rationale.

Claim 1:

Amended Claim 1 recites in part:

> a plurality of second storage units for storing leaf images of respective compute nodes, said leaf images comprising additional data blocks not previously contained in said root image and changes made by respective compute nodes to the blocks of said root image, wherein said leaf images of respective compute nodes do not include blocks of said root image that are unchanged by respective compute nodes (emphasis added)

Applicants respectfully assert the combination of Chang and Kobayashi does not teach or suggest "leaf images comprising additional data blocks not previously contained in said root image and changes made by respective compute nodes to the blocks of said root image, wherein said leaf images of respective compute nodes do not include blocks of said root image that are unchanged by respective compute nodes," as claimed in Claim 1.

For at least the same or similar reasons as recited above with regards to Claim 14, Applicants respectfully assert that Chang does not teach or suggest leaf images comprising changes made by respective compute nodes to the blocks of said root image, wherein said leaf images of respective compute nodes do not include blocks of said root image that are unchanged by respective compute nodes, as claimed in Claim 1. Applicants respectfully assert the deficiencies of Chang are not remedied by Kobayashi.

Therefore, Applicants respectfully assert that Claim 1 is not rendered obvious by the combination of Chang and Kobayashi. Accordingly, Applicants respectfully assert that dependent Claims 2-6 are patentable by virtue of their dependency on an allowable base claim, as well as for their additional recited patentable features.

Claim 7:

Independent Claim 7 recites features similar to that of independent Claim 1 and is therefore patentable for at least the same or similar reasons as recited above. Accordingly, Applicants respectfully assert that dependent Claims 8-13 are patentable by

virtue of their dependency on an allowable base claim, as well as for their additional recited patentable features.

For the above reasons, Applicants request reconsideration and withdrawal of the rejections under 35 U.S.C. §103.

CONCLUSION

In light of the above listed remarks, reconsideration of rejected Claims is requested. Based on the arguments presented above, it is respectfully submitted that Claims 1-27 overcome the rejections of record and, therefore, allowance of Claims 1-27 is earnestly solicited.

Please charge any additional fees that may be required to maintain pendency of the present application, or apply any credits to our PTO deposit account number: 50-4160.

Respectfully submitted,

MURABITO, HAO & BARNES LLP

Dated: April 5, 2010

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Electronic Acknowledgement Receipt

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First Named Inventor/Applicant Name:	Pradip Kulkarni
Customer Number:	70848
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Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		PNTA-P006CIPA-Response.pdf	123873 8275bbc9086ccc41c84fe0a8ec203d83bf8dadff	yes	18

Multipart Description/PDF files in .zip description		
Document Description	**Start**	**End**
Amendment/Req. Reconsideration-After Non-Final Reject	1	1
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